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MINERALOGY.[1]

Symmetry of Nepheline and Davyne.—Baumhauer's studies of the etched figures of nepheline produced by hydrofluoric and hydrochloric acids, have shown that the mineral belongs in that division of the hexagonal system in which trapezohedral or pyramidal hemihedrism is combined with hemimorphism—the first hemimorphic tetartohedrism of Liebisch—and that apparently simple individuals are usually compound twins, the twinning planes being the base and the second order prism. As more recent studies of Tenne seemed to lead to a different conclusion, Traube[2] has repeated Baumhauer's studies on excellent material from Vesuvius, with the result of confirming the latter in every particular. He has also obtained excellent figures on the prism planes by use of concentrated or warm dilute hydrochloric acid, the figures having the same symmetry but not the same form as those produced by hydrofluoric acid. He has observed one twinning law in addition to the two described by Baumhauer. The examination of a twinned section 5 mm. in thickness cut normal to the principal axis gave no evidence of circular polarization. He has investigated for the first time the etched figures of the closely related mineral Davyne, which may be easily etched with nitric acid. On the prism planes these figures possess two lines of symmetry, normal to one another, showing that the mineral is holohedral hexagonal. As nepheline is not attacked by nitric acid this affords a ready means of distinguishing the two minerals from one another. It is especially valuable because Traube finds that Davyne is not always optically positive as has been supposed.

The Minerals of the Emery Deposits of Naxos.—Except for a paper by Smith on the paragenesis of these deposits and one by Zirkel on the two chief minerals (corundum and magnetite), no scientific mineralogical study of the deposits has heretofore been made. Tschermak[3] contributes to the *Mittheilungen* the results of a detailed study of a large number of specimens from the locality. The island of Naxos is composed of fine grained gneisses and marbles resting on a basement of coarse grained gneisses. The emery occurs in numerous lenticular masses of great extent and having a thickness of 5 to 50 meters, enclosed in the granular limestone. It is chiefly a mixture of corundum and magnetite with hematite and limonite as alteration products. The only accessory mineral usually apparent to the naked eye is margarite, but Tschermak shows that there are often present in small quantities both the common micas, chlorotoid, Vesuvianite, diaspore, kyanite, staurolite, rutile, spinel, and pyrite. Thin sections were prepared and detailed descriptions are furnished of the optical properties of the different constituents. The corundum is part crystallized and part in grains. The crystals show zonal distribution of the pigment and optical anomalies, and are frequently filled with magnetite and rutile inclusions. The margarite yields in lath-shaped sections a positive bisetrix with axial plane normal to the cleavage. Basal sections afford a negative bisectrix with small optical angle. The double refraction is lower than that of muscovite. The structure of the emery is quite schistose, due chiefly to the distribution of the magnetite grains which form layers of variable thickness. Tschermak thinks that the original condition was a compact and homogeneous mass, and that the accessory minerals were separated out when the corundum and magnetite were crystallized. Analyses of the emery from Kremnó and Renidi were made by Ludwig with the following results:

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[1] Edited by Dr. Wm. H. Hobbs, University of Wisconsin, Madison, Wis.

[2] Neues Jahrb. f. Min. etc., Beil. Bd. ix, pp. 466–479, 1894.

[3] Min. u. petrog. Mittheil., xiv, pp. 311–342, 1894.

Kremnó.

SiO_2 5.64, B_2O_3 1.15, Al_2O_3 57.67, Fe_2O_3 33.36, MgO 0.83, CaO 0.43, K_2O 0.31, Loss on ignition, 0.70, Total 100.09.

Renidi.

SiO_2 5.45, B_2O_3 0.88, Al_2O_3 56.52, Fe_2O_3 34.65, MgO 0.43, CaO 0.90, Na_2O 0.60, K_2O 0.40, Loss on ignition 0.42, Total 100.25.

A lengthy detailed description of specimens of emery from the different localities closes the paper.

Boleite and Cumengeite.—In a separate publication Cumenge[4] has given a more complete description than has heretofore been made of the interesting minerals Boleite and Cumengeite, which were recently found in the copper mining district of Boleo in Lower California. *Boleite* occurs in apparently cubic crystals of a deep indigo blue color in an argillaceous gangue locally known as *Jaboncillo.* They fuse readily in a candle flame, have a hardness of 3, and a specific gravity of 5.08. The index of refraction is very high, approximately 2.07. The composition of the mineral is expressed in the formula $PbCl_2+CuOH_2O+\frac{1}{3}AgCl$ or as it was written by Mallard, $3 \{ PCbl (HO). \ CuCl(HO) \{ + AgCl$. The crystals are apparently cubes which are sometimes truncated by the octahedron or the dodecahedron. Cleavage is perfect parallel to (100) and less perfect parallel to (111). The optical properties show clearly that the apparent cubic form is caused by the twinning of three tetragonal individuals so that their axes are all normal to one another.

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[4] Note sur deux espèces minérales nouvelles la Boléite et la Cumengéite, par M. E. Cumenge, Paris, 1893.

Cumengeite is much like Boleite but occurs in pyramidal crystals, is more violet in tone, and has hardness and specific gravity somewhat inferior to those of Boleite. Chemically it differs from that mineral in the absence of $\frac{1}{3}AgCl$, the formula being given as PbC2 (Index) $+CuOH_2O$. The symmetry is tetragonal, the crystals being usually bounded by á (011) and m (110) and rarely also by p (001). In connection with the simple individuals of Boleite and Cumengeite are found very interesting twinned individuals which usually give the appearance which would result from attaching by its square face to each of the six faces of a cube the half of a symmetrically developed octahedron. The face of this particular pyramid (*l*) has not been observed on any of the individuals of either mineral. Sometimes the solid angles of the projecting pyramids formed by *l* are symmetrically truncated, so that an apparent cube with reentrant or grooved edges is the result. The composition of these interesting trillings has not been fully determined, but they are found to be intermediate between Boleite and Cumengeite in their content of silver. Mallard has applied to them the name Percylite which had before been used for an undetermined cubic mineral of somewhat allied characters. Friedel has succeeded in producing artificial crystals of both Boleite and Cumengeite by the action of copper chloride on lead hydrate.

The Formula of Pseudobrookite.—The chemical composition of pseudobrookite has been determined by Cedarström on material from Havredal in Norway and by Rimbach on selected material from the Aranyerberg in Siebenbürgen, to be represented by the formula $2Fe_2O_3 \ 3TiO_2$, the two analyses agreeing very closely. The analysis of an artificial pseudobrookite from Schönebeck on the Elbe yielded Doss the formula $Fe_2O_3 \ TiO_2$, and led the analyst to suppose that the mineral is isomorphous with andalusite. Frenzel[5] has undertaken an analysis of the material from the Aranyerberg and obtained results which agree perfectly with those of Cedarström and Rimbach. Traube has contributed to the same paper the almost identical results of an analysis of the same material, so that there can be little doubt that $2Fe_2O_3\ 3TiO_2$ is the correct formula of the mineral. Frenzel points out the absurdity of the supposed isomorphous relation with andalusite. Neglecting the earlier analyses by Koch and by Lattermann on imperfectly purified material, the analyses that have been made of pseudobrookite are as follows:

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[5] Min. u. petrog. Mittheil., xiv, pp. 126-130, 1894.

	I	II	III	IV	V	VI
TiO_2	44.26	42.49	33.59	42.89	42.35	42.896
Fe_2O_3	56.42	58.20	66.42	56.37	57.65	57.104
Total	100.68	100.69	100.01	99.26	100.00	100.000

I. Cedarström, II. Rimbach, III. Doss, IV. Frenzel, V. Traube, VI. theory from formula $2Fe_2O_3\ 3TiO_2$.

Formula of Staurolite.—Rammelsberg[6] takes exception to the formula for staurolite recently proposed by Penfield[7] ($HAl_5Fe\ Si_2O_{13}$). He claims that the analyses of staurolite show the mineral to represent chemically three varieties, as follows:— A, where $\overset{\mathrm{II}}{R} : R_2 = 1 : 2$; B, where $\overset{\mathrm{II}}{R} : R_2 = 1 : 2.5$; and C, where $\overset{\mathrm{II}}{R} : R_2 = 1 : 3$. Penfield's formula, he states, is not a general one because it only represents the analyses which fall in group B.

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[6] Neues Jahrb. f. Mineral., etc. Beil. Bd., ix, pp. 480–484, 1894.

[7] Am. Jour. Sci., (3) xlvii, pp. 81–89, 1894.

Wm. H. Hobbs.